

Appl. No. 10/520,563

Reply to Office action of 12/07/2007

**REMARKS/ARGUMENTS**

The applicant appreciates the thorough examination of his application.

The word "mixture" is substituted for the word "combination" in amended claims 1, 17 and 21 for clarity. That word is thought to be more consistent with combining by "dissolving or dispersing" as those words are used throughout the specification.

New claims 24 and 25 limit the form of the cocatalyst to a very fine dispersion.

With respect to the rejection of claim 23 due to failure to comply with the written description requirement of the first paragraph of 35 U.S.C. 112, the applicant points out that a person having ordinary skill in the art would understand that carbon potentials are normally expressed in percentage units. Carbon potentials are expressed in percentage units in the substitute specification as filed on pages 14 (see Table 1) through page 16.

Written description of the claimed range is provided in the substitute specification as filed by the carbon potential percentage values disclosed at page 14, lines 9-15, and in Table 1. For example, at 920°C, the presence (Y vs. N) of the cocatalyst allowed the carbon potential to be increased by  $1.40 - 1.25 = 0.15$  percent units without causing failure of the oxygen probe. Similarly, at 880°C, the presence of the cocatalyst allowed the carbon potential to be increased by  $1.35 - 1.15 = 0.20$  percent units. At 850°C, the presence of the cocatalyst allowed the carbon potential to be increased by  $1.25 - 1.00 = 0.25$  percent units. At 830°C, the presence of the cocatalyst allowed the carbon potential to be increased by  $1.00 - 0.75 = 0.25$  percent units. These results also show that the invention claimed by the applicant produces unexpected results.

With respect to the rejection of claims 1 and 2 due to anticipation by the Bucker et al. reference, the applicant noted that the reference does not teach that oxygen is a catalyst. Rather, in that reference, oxygen is a reactant, not a catalyst. The abstract of Bucker et al.'s invention explains it as follows: "The invention relates to a process for preparing a heat treatment atmosphere by a catalytic reaction in a catalytic reactor (16) between a first gas mixture (12) containing oxygen and a second gas mixture (26) containing a hydrocarbon, characterized in that the catalytic reactor is arranged in substantially vertical position and in that the reaction mixture is introduced into the catalytic reactor through the bottom (19) of the reactor with recovery of the heat treatment atmosphere resulting from the reaction at the top (20) of the reactor." The applicant's claimed invention eliminates the need for the complex reactor required by Bucker et al. In fact, the disadvantages of this type of reactor are explained in the substitute specification as filed at page 2, lines 26-30, and at page 3, lines 1-2. Therefore, the reference does not anticipate the claims.

With respect to the rejection of claims 7 and 21 due to anticipation by the Bucker et al. reference, the reference does not teach a catalyst in the form of a very fine dispersion as recited in the applicant's claims. Moreover, the applicant's claims do not recite the use of a non-noble metal such as nickel. Rather, the applicant's disclosure teaches the use of nickel nitrate. Therefore, the reference does not anticipate the claims. Moreover, claims 7 and 21 limit the form of a preferred embodiment of the cocatalyst to "a gas phase or a very fine dispersion."

With respect to the rejection of claims 1, 2, 7 and 21 due to anticipation by the Tsurumi et al. reference, the reference does not teach the use of gases or finely divided cocatalyst particles in a heat treatment apparatus as recited in the applicant's claims. The only place "heat treatment" is mentioned in the reference is at column 7, lines 22-23, and discloses heat treatment for alloying of the catalyst itself. The catalysts claimed and used by the applicant are not prepared by alloying metals at high temperatures as required by the Tsurumi et al. reference. Claims 1, 2, 7 and 21 do not recite nickel nitrate, and nickel nitrate is not disclosed as a co-catalyst in the reference at col. 5, lines 15-25. Rather, nickel nitrate is disclosed as a reactant (that allows platinum to alloy with nickel, see col. 5, lines 8-9) in the reference. The application of a

platinum alloy carbon catalyst and a tetrafluoroethylene dispersion solution (which is not a catalyst) to a carbon sheet and sintering the sheet in making an electrode (see col. 6, lines 28-35) does not anticipate the claimed invention. So it is not clear why the reference was cited by the Examiner because the invention of Tsurumi et al. is not at all similar to the invention claimed by the applicant.

With respect to the rejection of claims 16-19 and 22 due to obviousness over the Tsurumi et al. reference, the applicant points out that the teachings of the reference are not related to the claimed invention. The invention of claim 16 is a method for making a heat treatment atmosphere by combining the composition of matter of claim 15 with a heat treatment atmosphere material. The Tsurumi et al. reference teaches a process for alloying metals on inorganic supports to produce catalysts "for various chemical reactions and for the electrodes of fuel cells" (col. 1, lines 16-17). The reference does not teach "a catalyst composition that has all the requisite components" as suggested by the Examiner. The applicant respectfully requests that the Examiner provide a reference that supports his assertions as required by 37 CFR 1.104(b)(2). The subject matter of the reference is not the same as that of the subject matter of claims 16-19 and 22 and the reference does not teach a cocatalyst that "is capable of existing in the form of a gas phase or a very fine dispersion" as recited by the claims.

With respect to the rejection of claim 20 due to obviousness over the Tsurumi et al. reference in view of the Hayashi et al. reference, the applicant notes that the cited references have nothing to do with use of cocatalysts in a heat treatment apparatus, which is the invention claimed by the applicant. The only catalyst mentioned in the Hayashi et al. reference is "a catalyst comprising metal loaded on a carrier" (abstract). That catalyst is involved in "a method of producing a diol derivative" and not a method of heat treatment. The fact that lanthanum nitrate and nickel nitrate are cited as examples of water-soluble compounds that are useful in a method of producing a diol derivative does not suggest their use in the applicant's claimed invention. The applicant respectfully requests that the Examiner provide a reference that supports his assertions as required by 37 CFR 1.104(b)(2).

In summary, as required by the Supreme Court in KSR Int'l Co. v. Teleflex, Inc. 550, U.S. \_\_ (2007), the claimed invention does more than "yield a predictable result." Some of the references teach away from combining the elements that the applicant combined. The applicant has provided evidence that his "elements worked together in an unexpected and fruitful manner." The rule is when a patent "simply arranges old elements with each performing the same function it had been known to perform" and "yields no more than one would expect from such an arrangement, the combination is obvious." The applicant has shown that "the improvement is more than the predictable use of prior art elements according to their established functions."

The applicant has shown that there is no "reason that would have prompted a person of ordinary skill in the relevant invention would not have been "obvious to try."

Based on the above showings, the applicant respectfully requests that a timely Notice of Allowance be issued in this case.

The Commissioner is hereby authorized to charge any fees under 37 CFR 1.16, 1.17 and 1.492 which may be required during the entire pendency of this application to Deposit Account No. 500593.

Respectfully submitted,  
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